



a n e u r i s t

Integrated biomedical informatics for the management of cerebral aneurysms

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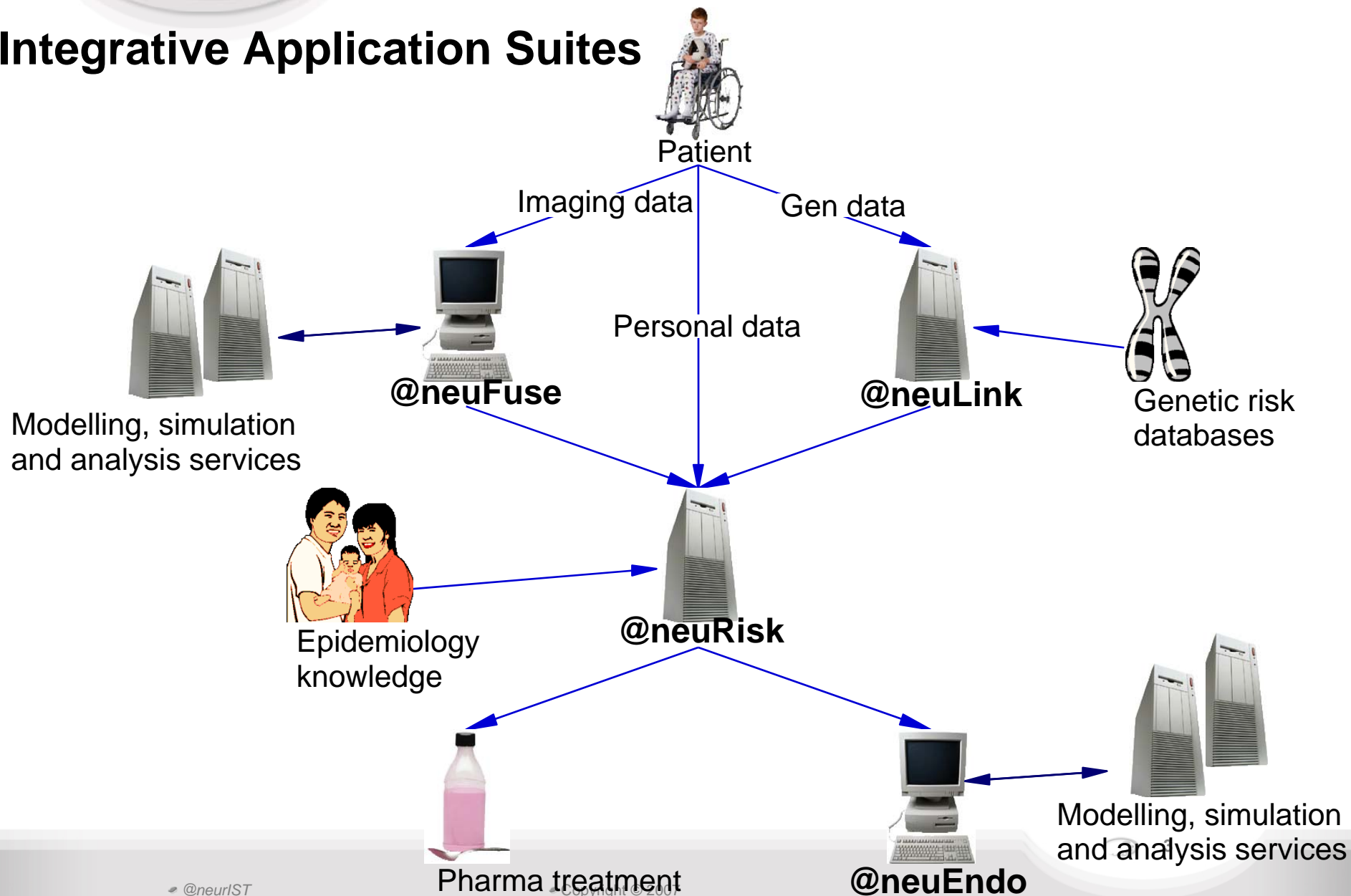


EU Project @neurIST (2006-2009) IST-2004-027703

- Development of a **generic IT infrastructure** for the **management and processing of heterogeneous data** associated with the **diagnosis and treatment** of cerebral aneurysms and subarachnoid haemorrhage.
- **Integrated Application Suites**
 - **@neuRisk** - personalised risk assessment
 - **@neuEndo** – virtual endovascular treatment planning & stent design
 - **@neuLink** - linking genetics to disease
 - **@neuFuse** - modeling, simulation & visualization of multimodal data
- **@neurIST service-oriented Grid infrastructure**
 - on-demand **simulation and analysis services**
 - (semantic) **data-integration services**handling multi-scale, multi-modal information at distributed sites.

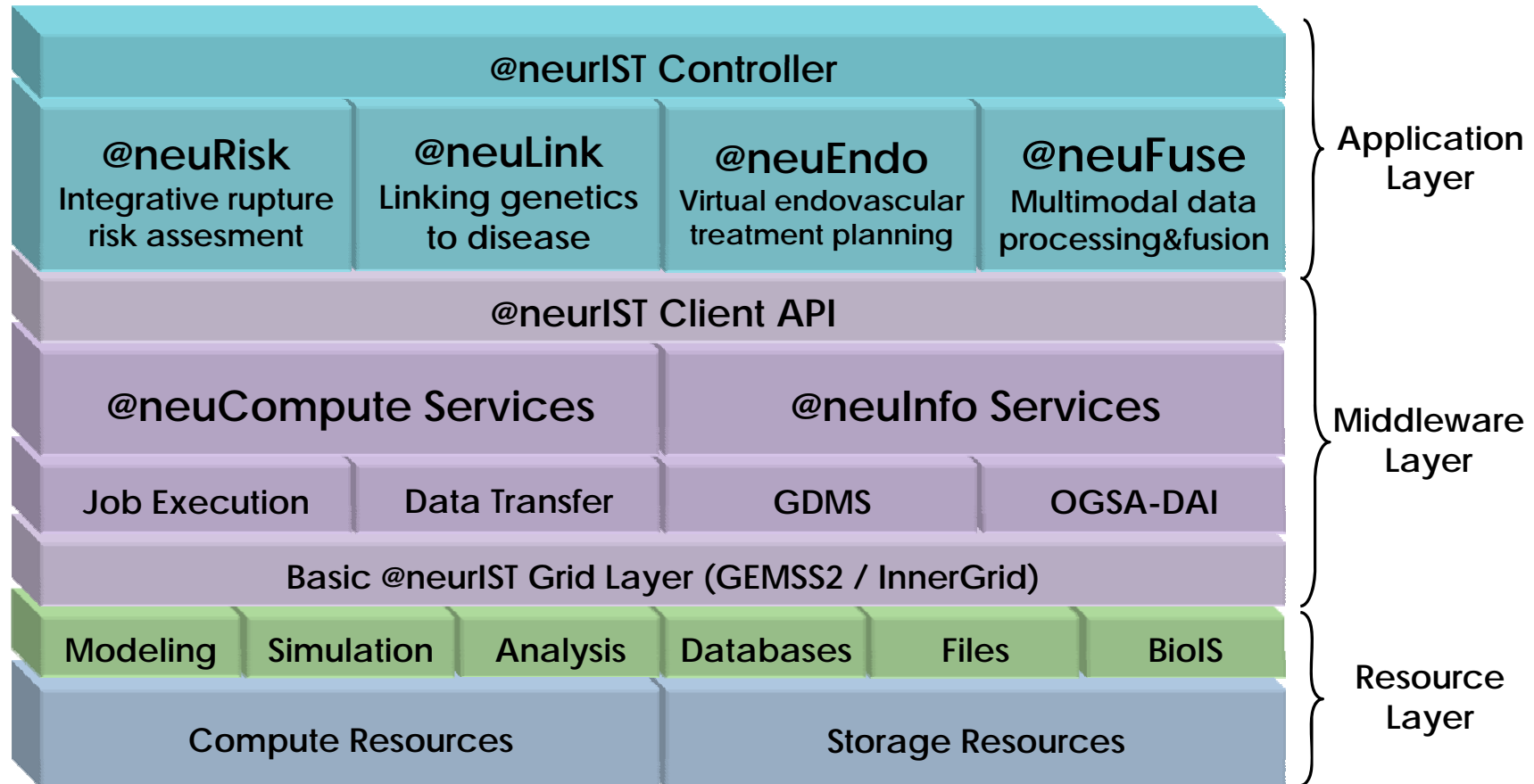


Integrative Application Suites





@neurIST Grid Infrastructure



- **Grid Middleware: GEMSS2, InnerGrid; Standard Web Services (WS-I)**
- **Data Integration: OGSA-DAI – WS-DAI; DQP; SQL**
- **Semantics: OWL, SPARQL**



Data Integration

Approach

- Semantic Data Mediation
- Federation of Services
- CRIM, Ontology
- Security, Pseudonymization, ...

Hospital information systems

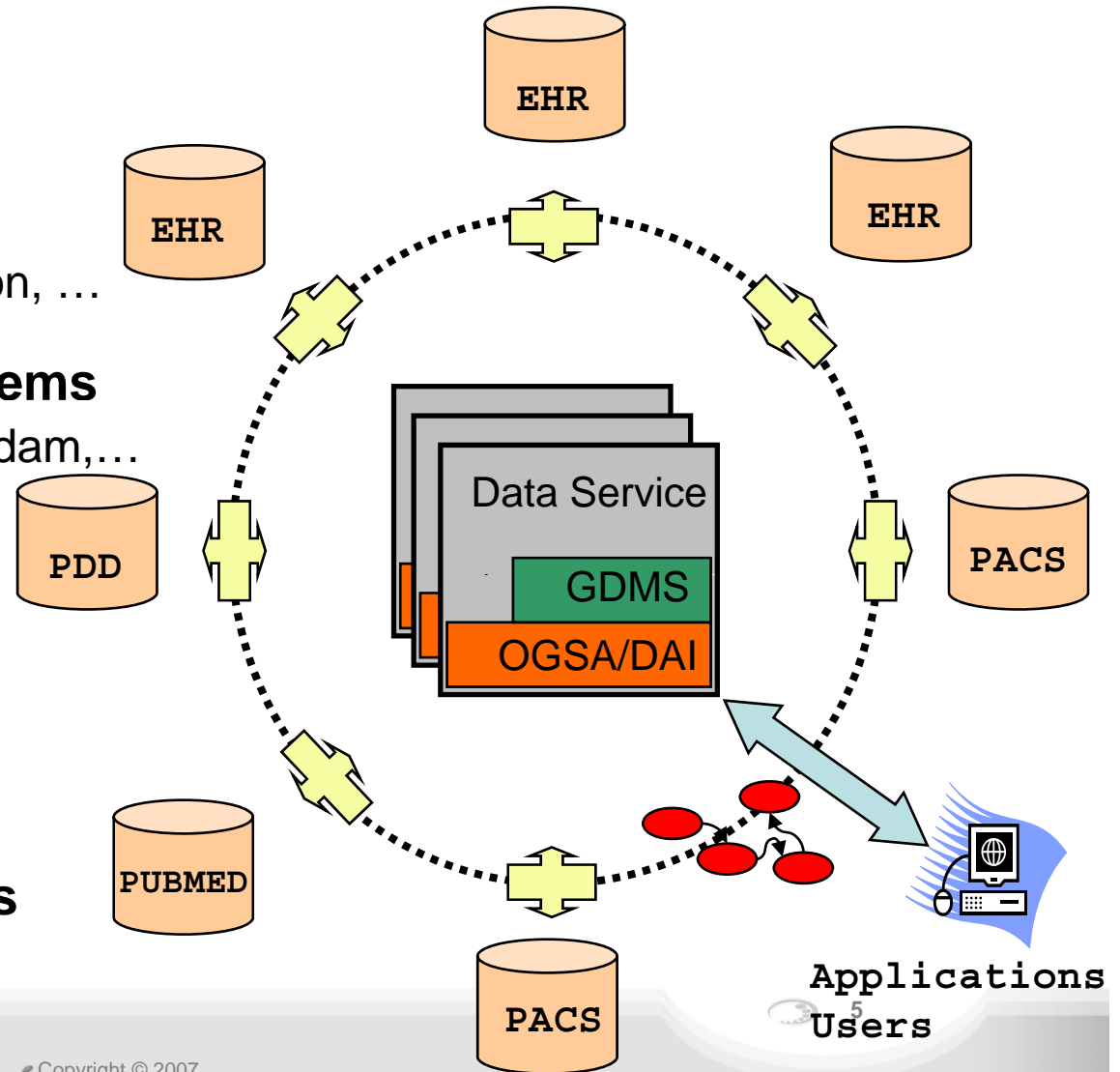
- Sheffield, Geneva, Rotterdam, ...
- EHR, PACS, ...

Public databases

- Genetic: EBI, NCBI
- Literature: Medline, etc.

Product design databases

- COTS stents, coils, etc.

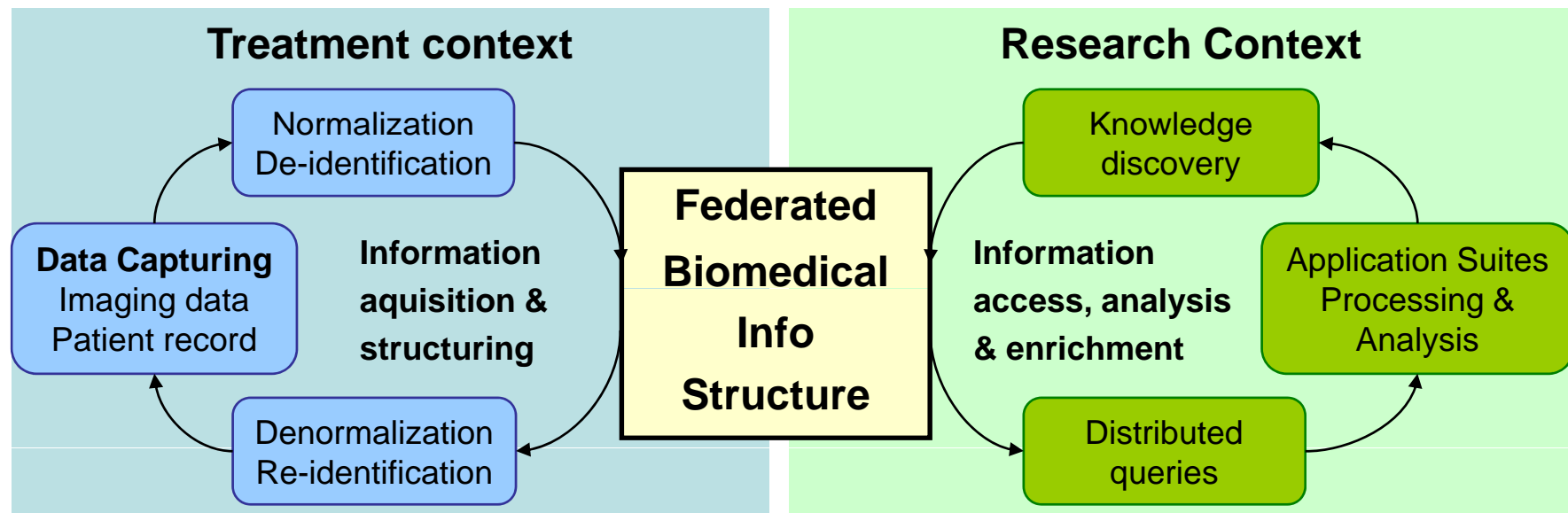




• Clinical Reference Information Model (CRIM)

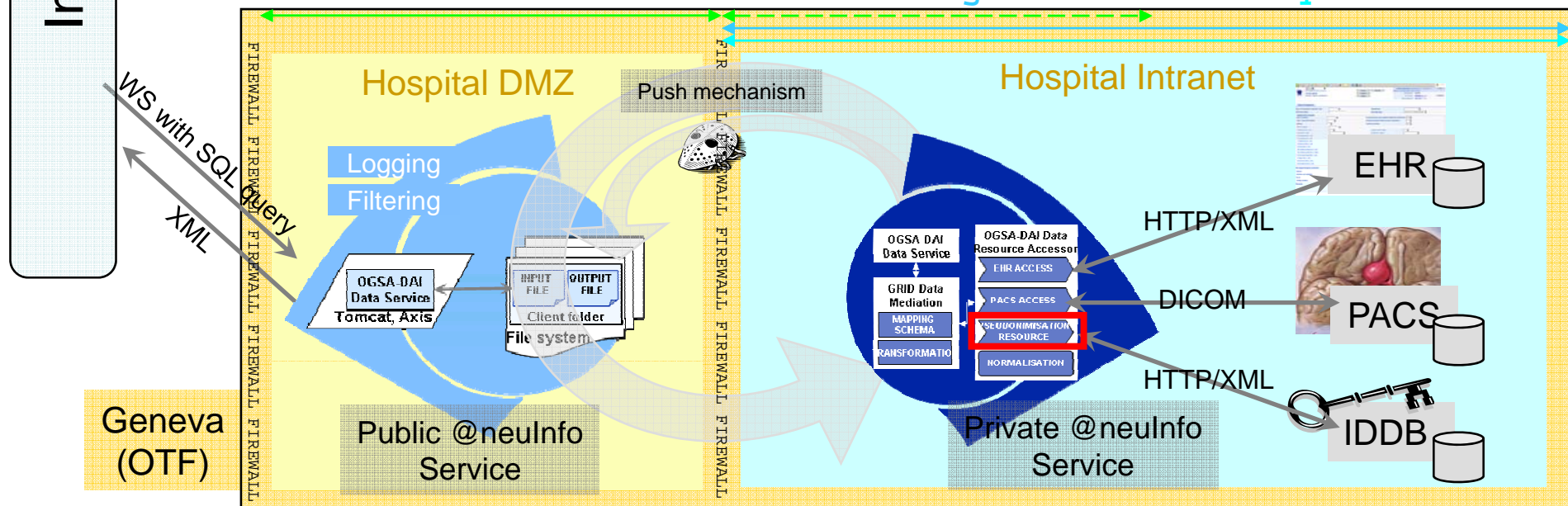
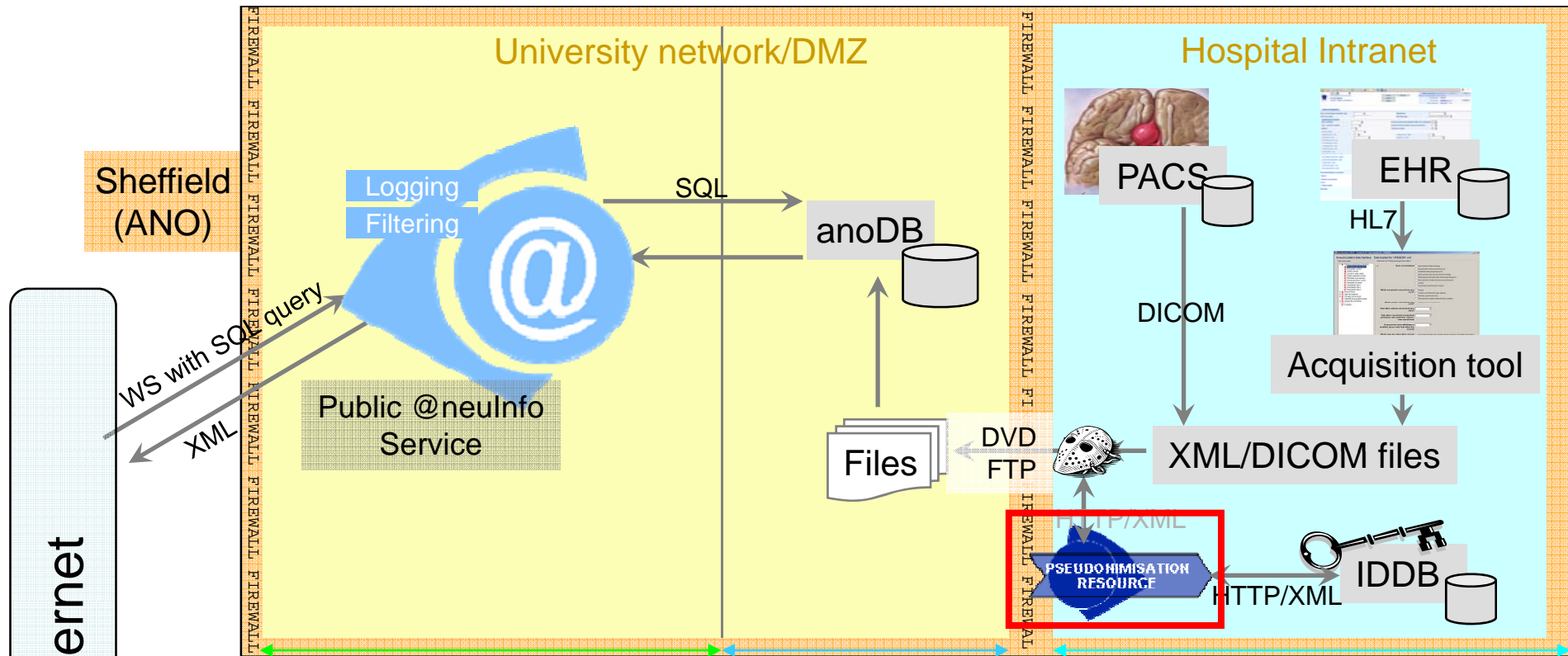
Defines all information to be captured for a patient

- clinical information (imaging, diagnostic and treatment data, ...)
- administrative information
- research results produced (indicators)



• Biomedical data infostructure

Two different architectures (see next slide)





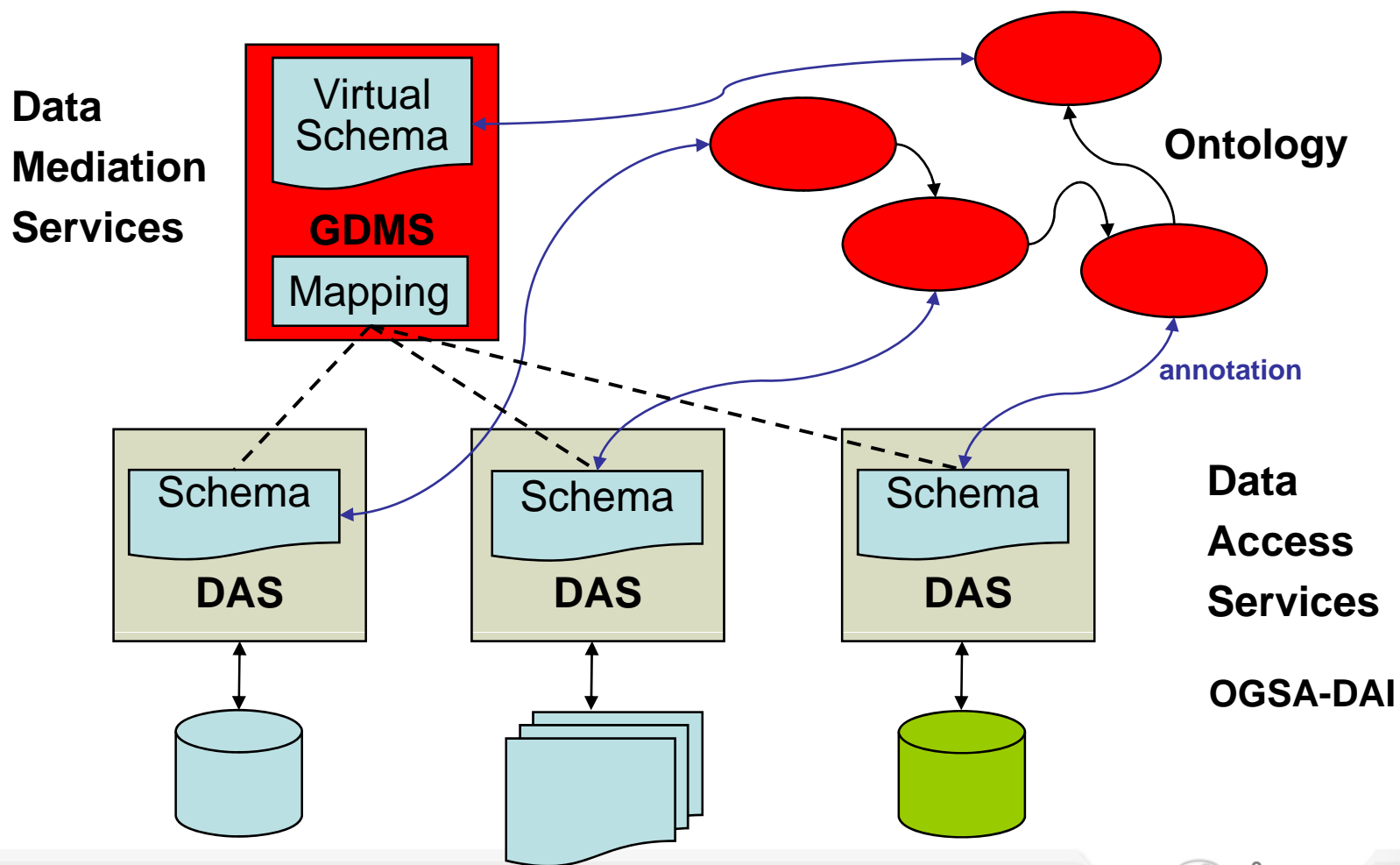
@neurIST Ontology

- Global conceptual schema of the disease
- Conceptual space
 - Clinical Medicine
 - Molecular Biology
 - Epidemiology
 - Simulation
 - Disease
 - Risk factor
- Incorporating “approved” existing ontologies
 - FMA - Foundational Model of Anatomy
 - GO - Gene Ontology
 - DOLCE as Upper Ontology
- Concepts are mapped to Unified Medical Language System (UMLS)
- OWL-DL
- Lead partner: University of Freiburg

Classes	Relationship Types	Definitions	UMLS Map
2139	85	1096	1183



Semantic Data Integration





@neurIST Security Architecture

- Pseudonymisation Service
- End-to-end security
- Attribute-based access control (ABAC)
- Certificate and Registration Authorities; Federated VO model
- Security Token Service
- Logging, Filtering Services
- Auditing
- Provenance

built on top of Web services security standards



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